September 10, 2008

Mr. Jeff Butler, Program Manger
The Alaska Building Science Network
5401 Cordova Street, Suite 303
Anchorage, Alaska 99518

Subject: Crooked Creek Water Plant Waste Heat Project

Mr. Butler,

I spoke with Mr. Brian Gray, Engineer of Alaska Energy & Engineering, Inc. on the specs' of his design and agreed with his concept of how this project would work after everything is in operation. We both have extensive experience in working with waste heat construction and agreed to get rid of the BTU's calculating instruments that were designed into the system. We also called on the Kuskokwim Power Authority and Mrs. Evelyn Thomas, Tribal Administrator of Crooked Creek and they also agreed to eliminate the BTU calculating instruments. At this time I would like to commend Mrs. Thomas on being the driving force of this project along with the Water Plant Operator, Mr. Tom Parent, who was persistent for this new concept. We put our data together from the past 12 yrs. of the water plant using an average of 4 thousand gallons of fuel oil per year. With the engineering and the direction of construction, the project may be done for approximately $44,250.

What has the waste heat accomplished for the water plant? How does it work? Basically the waste heat system is brought into the return line system with a return and a supply line with a gate between the two. The returning cooler water which is approximately 165 degrees returning to the boiler is now routed to the power plant and is heated to 180 degrees, then, comes back in front of the gate and goes into the boiler. The water is now 180 degrees and does not cause the boiler to come on line because the settings of the boiler system is satisfied. If the demand on the boiler or hydronic system is greater than the BTU's supplied by the power plant, the boiler will come on line and assist with the waste heat to satisfy the 180 degrees. These demands only occur when the outside temperatures are sub-zero degrees. Being mindful, the washeteria is also supplied with the waste heat for operation. If all three dryers are running, it puts a large demand on the BTU's needed to run the water plant. Also, when the water plant is making water, the well water is coming in at 34 degrees and is heated to 48 degrees, putting another large demand on the BTU's. Now that

Now that we know what is needed at the water plant, you can see the demand of BTU's needed to run the plant. Keep in mind, that every gallon of fuel oil used, rounded off, will give off approximately 100,000 BTU's. The project went very well and as you can see from the pictures taken, it is not over designed; it is very simple and operates efficiently. You can also see the inside of the water plant is all done in copper and outside of the building is welded black iron pipe. This project was engineered to have 2-inch black iron pipe that is insulated with 2-inch foam, and an outside rubber flexible shield to protect the insulation from weather. The waste heat system project ran from the power plant to the water plant, which is approximately 140 ft. apart.

After one months service, the waste heat system seems to be doing quite well. With the school on line, which uses much electricity, the power plant is putting out sufficient BTU's to run the water plant. We have yet to see what happens when the sub-zero temperatures of winter come in. With past experiences, in putting these systems in, we are figuring that it may burn approximately 1,000 gallons of heating fuel. If the water plant purchased the usual 4,000 gallons of heating fuel, it would cost them $29,600 at $7.40 per gallon. If our predictions hold true and they are only going to use ¼ of the fuel, which would be 1,000 gallons at $7.40 per gallon, it would cost $7,400. The village would save $22,200. There is only one unknown factor at this point. What would be the cost of the waste heat from the power plant sold to the water plant? As you can see, the cost of savings is going to be phenomenal year by year. This is not a new concept; it has been used in the past in many areas of bush Alaska. Because of the energy crunch, you are going to see this waste heat concept used much more in the future. It would be very interesting to back track in one to two years to see how much this water plant has saved.

Great appreciation goes to the two entities, ANTHC and The Alaska Building Science Network, that made this project possible by their funding.

Sincerely,

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